Data Sufficiency: Challenge

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Contents

1 Introduction

This document contains nothing but difficult GMAT Data Sufficiency questions–100 of them, to be exact. Data Sufficiency is a question type that you probably have never encountered before you started studying for the GMAT, so it's important to master all the ins and outs of this type before attempting the exam.

As in all of my GMAT preparation resources, you'll find these questions indexed by difficulty. That doesn't mean you should skip straight to the hardest questions, or even that you should start with the easier ones. On the GMAT itself, questions won't come labeled with their difficulty level, and despite the intent of the adaptive algorithm, they won't be precisely consistent in terms of difficulty either. Each question presents its own unique challenges, and the sooner you get accustomed to changing gears with every single question, the more time you'll have to prepare for that particular challenge of the exam.

For further, more specific practice, I have produced several other resources that may help you. There is one 100-question "Challenge" set that covers only Problem Solving questions, as well as several "Challenge" sets on topics such as Arithmetic, Algebra, Geometry, Number Properties, and Word Problems.

Also, The GMAT Math Bible has dozens of chapters covering the content you need to know for every type of GMAT problem. It's one thing to master an approach to Data Sufficiency, but that is only effective if you have already conquered the math basics. If you find you are struggling with the mechanics of these problems, your time is probably better spent with the GMAT Math Bible than in doing dozens and dozens of practice problems, hoping to pick up those skills along the way.

If you find yourself having problems with only the most difficult questions, you might try my "Extreme Challenge" set, which contains only 720 and higher level questions, many of which are Arithmetic-related.

As far as strategy is concerned, there are dozens of articles at GMAT HACKS to help you with your strategic approach to Arithmetic questions. Most importantly, you should make sure you understand every practice problem you do. It doesn't matter if you get it right the first time–what matters is whether you'll get it right the next time you see it, because the next time you see it could be on the GMAT.

With that in mind, carefully analyze the explanations. Redo questions that took you too long the first time around. Review questions over multiple sessions, rather than cramming for eight hours straight each Saturday. These basic study skills may not feel like the key to GMAT preparation, but they are the difference between those people who reach their score goals and those who never do.

Enough talking; there are 100 Data Sufficiency questions waiting inside. Get to work!

2 Difficulty Level

In general, the level 5 questions in this guide are 550- to 600-level questions. The level 6 questions are higher than that, representing a broad range of difficulty.

Moderately Difficult (5)
002, 006, 007, 008, 009, 011, 013, 016, 021, 023, 024, 026, 027, 029, 030, 033, 034, 038, 039, 041, 043, 044, 045, 046, 047, 048, 049, 050, 051, 052, 054, 056, 063, 064, 067, 071, 074, 075, 076, 080, 081, 084, 085, 086, 089, 090, 092, 095, 100

Difficult (6)
001, 003, 004, 005, 010, 012, 014, 015, 017, 018, 019, 020, 022, 025, 028, 031, 032, 035, 036, 037, 040, 042, 053, 055, 057, 058, 059, 060, 061, 062, 065, 066, 068, 069, 070, 072, 073, 077, 078, 079, 082, 083, 087, 088, 091, 093, 094, 096, 097, 098, 099

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3 Questions

Note: this guide contains both an answer key (so you can quickly check your answers) and full explanations.

(A) Statement (1) ALONE is sufficient, but statement (2) alone is not sufficient.
(B) Statement (2) ALONE is sufficient, but statement (1) alone is not sufficient.
(C) BOTH statements TOGETHER are sufficient, but NEITHER statement ALONE is sufficient.
(D) EACH statement ALONE is sufficient.
(E) Statements (1) and (2) TOGETHER are NOT sufficient.

1. If x, y, and z are three integers, are they consecutive integers?
   (1) $z = x + 2$
   (2) None of the three integers are multiples of 3.

2. If $y = 0.jkmn$, where j, k, m, and n each represent a nonzero digit of y, what is the value of y ?
   (1) $j < k < m < n$
   (2) $j + a = k$, $k + a = m$, and $m + a = n$, where $j > a > 1$.

3. Is x between 0 and 1?
   (1) $x^2 > x^3$
   (2) $-x > x^3$

4. In the equation $x^2 - bx + c = 0$, b and c are constants. What is the value of b ?
   (1) -3 is a root of the equation $x^2 - bx + c = 0$.
   (2) $x + 3$ is a factor of $x^2 - bx + c = 0$.

5. If n is an integer, is $\frac{29-n}{n}$ an integer?
   (1) n is prime.
   (2) n is an odd factor of 116.

6. Is $ab > 11$?
   (1) $a < 6$ and $b < 2$
   (2) $\frac{a}{b} > 0$

7. Is $\sqrt{t}$ an even integer?
   (1) t is equal to m^2.
   (2) m is an even integer.

8. What is the value of xy ?
   (1) The average of x and y is 7.
   (2) The average of x and $-y$ is 1.

9. Is $x > y > z$?
   (1) x, y, and z are consecutive integers.
   (2) $nx > ny > nz$, where n is an integer.

10. If m is a positive integer greater than 1, can m be expressed as the product of two integers, each of which is greater than 1?
    (1) m is the square of an integer.
    (2) m is the cube of an integer.

11. If $yz = -6$, what is the value of $yz(y + z)$?
    (1) $y^2 = 9$
    (2) $z^2 = 4$

12. If p is an integer, then p is divisible by how many positive integers?
    (1) $p = 2^x$, where x is a prime number.
    (2) $p = x^2$, where x is a prime number.

13. City X has 1.2 million residents, 15 percent of who are full-time students. What percent of full-time students in City X are male?
    (1) City X has 95,000 male residents who are full-time students.
    (2) City X has 510,000 male residents who are not full-time students.

14. If y is an integer, is y^3 divisible by 12?
    (1) y is divisible by 4.
    (2) y is divisible by 6.

15. Can the positive integer q be written as the sum of three different positive prime numbers?
    (1) q is less than 11.
    (2) q is odd.

16. If p is an integer, is p a prime number?
    (1) $p - 2$ is a prime number.
    (2) $p + 2$ is a prime number.

17. If y is an integer such that $2 < y < 100$ and if y is also the square of an integer, what is the value of y?
    (1) y has exactly two prime factors.
    (2) y is even.

18. The symbol ∇ represents one of the following operations: addition, subtraction, multiplication, or division. What is the value of $4\nabla 3$?
    (1) $2\nabla 2 = 4$
    (2) $2\nabla 0 = 2$

19. If x is a positive integer and w is a negative integer, what is the value of $x - w$?
    (1) $w^x = 9$
    (2) $x + w = -1$

20. Is the positive integer x a multiple of 16?
    (1) x is a multiple of 8.
    (2) x^2 is a multiple of 32.

21. If O and P are each circular regions, what is the area of the smaller of these regions?
    (1) The difference between the areas of regions O and P is 21π.
    (2) The difference between the circumferences of regions O and P is 6π.

22. The number N is $5,H72$, the hundred's digit being represented by H. What is the value of H?
    (1) N is divisible by 4.
    (2) N is divisible by 9.

23. If m and n are integers, is $m + n$ divisible by 3?
    (1) $\frac{m+n}{2}$ is divisible by 3.
    (2) m is divisible by 3.

24. What is the value of $a - b$?
    (1) $a^2 - 2ab + b^2 = 16$
    (2) $|a - b| = 4$

25. If x is less than 80 percent of y, is x less than 100 ?
    (1) $x = y - 24$
    (2) $y < 125$

26. Is $x > 0$?
   (1) $x < x^2$
   (2) $x < x^3$

27. If m and n are positive integers and $mn = 30$, what is the value of m ?
   (1) n is an odd prime.
   (2) m and n are consecutive integers.

28. An empty swimming pool with a capacity of 75,000 liters is to be filled by hoses X and Y simultaneously. If the amount of water flowing from each hose is independent of the amount flowing from the other hose, how long, in hours, will it take to fill the pool?
   (1) If hose X stopped filling the pool after hoses X and Y had filled half the pool, it would take 21 hours to fill the pool.
   (2) If hose Y stopped filling the pool after hoses X and Y had filled half the pool, it would take 16 hours to fill the pool.

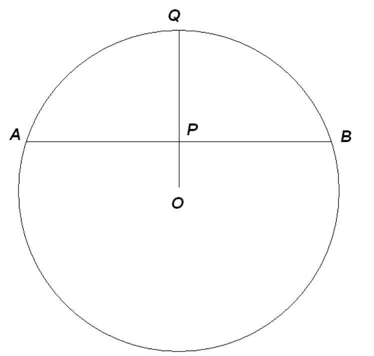
29. How many integers n are there such than $v < n < w$?
   (1) v and w are positive integers.
   (2) $v - w = 4$

30. Is $xy \leq 6$?
   (1) $1 \leq x \leq 2$ and $4 \leq y \leq 6$
   (2) $x + y = 7$

31. If $x \neq 0$, what is the value of $\left(\frac{x^p}{x^q}\right)^3$?
   (1) $p - q = 1$
   (2) $x = 4$

32. If $xy < 3$, is $x < 3$?
   (1) $|y| > 1$
   (2) $|x| < 3$

33. If $\frac{r}{s} = \frac{2}{5}$, what is the value of rs ?
   (1) If $\frac{2s}{5}$ is multiplied by 12, the result is 25.
   (2) If $\frac{5r}{2}$ is multiplied by 4, the result is 250.



34. What is the length of chord AB in circle O above?
    (1) $OQ = 5$
    (2) $OP = 3$

35. Is $\frac{7^{x+2}}{49} > 1$?
    (1) $7^{x-2} > \frac{1}{49}$
    (2) $7^{x-1} > \frac{1}{49}$

36. How long, in minutes, did it take a bicycle wheel to roll along a flat, straight 300-meter path?
    (1) The wheel made one full 360-degree rotation every 1.5 meters.
    (2) The wheel made 18 360-degree rotations per minute.

37. What is the ratio of the number of bottles of Brand X to bottles of Brand Y soft drink sold last year?
    (1) Last year, if the number of bottles of Brand Y sold had been 7 percent greater, the number of bottles of Brand X sold would be 60% of the number of bottles of Brand Y sold.
    (2) Last year, 553,725 bottles of Brand X soft drink were sold.

38. If x, y, and z are numbers, is $z = 24$?
    (1) $x = -y = z$
    (2) The average (arithmetic mean) of x and y is 8 less than the average of x, y, and z.

39. After winning 80 percent of the first 40 matches he played, Igby won 50 percent of his remaining matches. How many total matches did he win?

(1) If Igby had won 50 percent of the total number of matches he played, he would have lost 12 more total matches.
(2) If Igby had won 80 percent of the total number of matches he played, he would have won 18 more total matches.

40. Is x^2 greater than x ?

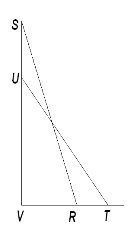
(1) x^2 is greater than $2x$.
(2) $2x^2$ is greater than x.

41. If r and s are consecutive even integers, is r greater than s ?

(1) r is prime.
(2) $rs > 0$

42. If p and x are integers, is x divisible by 11 ?

(1) $x = 2(p - 3)$
(2) $2p + 5$ is divisible by 11.



43. In the figure above, segments RS and TU represent two positions of the same support beam leaning against the side SV of a structure. The length VT is how much greater than the length RV ?

(1) The ratio of the length of VR to VT is $\sqrt{6} : 2$.
(2) The ratio of the length of SV to UV is $2 : \sqrt{2}$.

44. If x and y are positive integers, what is the value of x ?

(1) x, y, and xy are distinct perfect squares less than 100.
(2) $x < 5$

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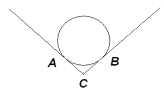


45. As shown in the graph above, the circular base of a large oak tree sits in a level field and touches two straight sides of a fence at points A and B. Point C shows where the two sides of the fence meet. How far from the center of the tree's base is point B ?

(1) $AB = CB$
(2) The center of the base is 25 feet from point C.

46. Is the positive square root of x an integer?

(1) $x = n^6$ and n is an integer.
(2) $x^2 = m$ and m is an integer.

47. If x and z are positive numbers less than 16, is z greater than the average (arithmetic mean) of x and 16 ?

(1) $z > x$, and both x and z are perfect squares.
(2) $x \neq 1$

48. If z is negative, is y greater than zero?

(1) $y - z = 4$
(2) $yz = -12$

49. Is $\frac{x}{p}(p^2 + q^2 + r^2) = xp + yq + zr$?

(1) $yq = r^2$ and $zr = q^2$
(2) $x = p$

50. If $V = \frac{10x}{3y}$ and $y \neq 0$, what is the value of V ?

(1) $5x$ is three times the value of one-half of $3y$.
(2) $y = \frac{1}{12}$

51. If a, b, and c are positive, is $a = \frac{b^2}{c}$?

(1) $\frac{a}{c} = \frac{b}{c}$
(2) $b = c$

52. For a certain set of n numbers, where $n > 2$, is the average (arithmetic mean) equal to the median?

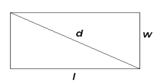
(1) The difference between the smallest number in the set and the middle number is equal to the difference between the largest number and the middle number.

(2) $n = 3$

53. If k is a positive integer, is $\sqrt{k}$ an integer?

(1) $1 < \sqrt{k} < 4$

(2) k has exactly three factors.



54. What is the length of diagonal d in the rectangle above?

(1) $l^2 + w^2 = 13$

(2) $l + w = 5$

55. If p is an integer, is q an integer?

(1) pq is an integer.

(2) $p + q$ is not an integer.

56. The rules of a certain board game specify that for each turn, a player will receive either 60 points or 10 points. If a player takes 20 turns, how many points did he receive?

(1) If the player had received 60 points in one more turn than he did, his total would be 50 points higher.

(2) If the player had received 60 points in four more turns than he did, his total would be 200 points higher.

57. In the fraction $\frac{x}{y}$, where x and y are positive integers, what is the value of y ?

(1) $\frac{x}{y+2}$ is an integer.

(2) $x < 4$

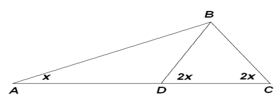
58. If $x \neq y$, is $\frac{1}{x-y} < y - x$?

(1) $x^2 + y^2 < 4xy$

(2) $y < x$

59. If x and y are nonzero integers, is $x^y < y^x$?
   (1) x and y are consecutive integers.
   (2) $x^y = 64$

60. If z is a positive integer, is $\sqrt{z}$ an integer?
   (1) $\sqrt{3z}$ is an integer.
   (2) $\sqrt{4z}$ is not an integer.



61. In triangle ABC above, what is the measure of $\angle DBC$?
   (1) Triangle ABD is isoceles.
   (2) $\angle ADB = 100$

62. If $xy \neq 0$, is $\frac{1}{x} + \frac{1}{y} = 6$?
   (1) $x = y$
   (2) $x + y = \frac{2}{3}$

63. Is the perimeter of equilateral triangle T equal to the circumference of circle C ?
   (1) The sum of the lengths of a side of T and the radius of C is 9.
   (2) The length of a side of T is equal to the diameter of C.

64. If p and q are negative, is $\frac{p}{q}$ greater than 1 ?
   (1) The positive difference between p and q is 2.
   (2) $q - p < 1$

65. Is $4m - 5n > m^2$?
   (1) n is negative.
   (2) m is an integer between 0 and 4, inclusive.

66. In a certain high school graduating class, 60 percent of the students plan to attend college, and 40 percent of the students have grade point averages (GPAs) of 3.0 or above. If 30 percent of the students who plan to attend college have GPAs of 3.5 or above, how many of the students who plan to attend college have GPAs of 3.5 or above?

(1) 90 of the students who plan to attend college have GPAs of 3.0 or above.
(2) 90 of the students in the graduating class have GPAs of 3.5 or above.

67. In $\triangle JKM$, if $JK = x$, $KM = y$, and $JM = z$, which of the three angles has the least degree measure?

(1) $x = y\sqrt{3}$
(2) $y = \frac{z}{2}$

68. Is the prime number q equal to 29 ?

(1) $q - 1$ has exactly 6 positive factors.
(2) 2 and 3 are prime factors of $q + 1$.

69. What is the value of $(x - y)^2$?

(1) $(x + y)^2 = 81$
(2) $(x + y)(x - y) = -9$

70. The symbol $\rightarrow$ represents one of the following operations: addition, subtraction, multiplication, or division. What is the value of $1 \rightarrow 1$?

(1) $1 \rightarrow 1 = 2 \rightarrow 2$
(2) $0 \rightarrow 1 = 0$

71. If $w + k = v$, what is the value of k ?

(1) $v^3 = w^3$
(2) $v^2 = w^2$

72. Is x a negative number?

(1) $5x + 1 > 6x$
(2) $x^2 > 1$

73. In Monroe School, 30 members of the faculty coach boys' or girls' sports or both. If 18 of these members of the faculty do not coach boys' sports, how many of these members of the faculty coach both boys' and girls' sports?
    (1) The 30 members of the faculty who coach boys' or girls' sports or both represent 60% of the total faculty members.
    (2) 10 of these members of the faculty do not coach girls' sports.

74. If q is an integer, is q odd?
    (1) $\frac{q}{3}$ is an integer.
    (2) $3q$ is an integer.

75. If $m + p = 26$, what is the value of mp ?
    (1) The ratio of $m : p$ is $6 : 7$.
    (2) m and p are consecutive even integers.

76. What is the value of the integer y?
    (1) $40 < y < 44$
    (2) y has at least one factor k such that $1 < k < y$.

77. What is the average (arithmetic mean) of k and m ?
    (1) The average (arithmetic mean) of $k + n$ and $m + n$ is 15.
    (2) The average (arithmetic mean) of k, m, and n is 8.

78. Is $rst = 1$?
    (1) $r\sqrt{t} = \frac{s\sqrt{t}}{s}$
    (2) $\frac{rt}{\sqrt{t}} = \frac{\sqrt{t}}{st}$

79. On a certain highway, 25 percent of the vehicles are trucks and 20 percent of the vehicles exceed the speed limit. If 50 percent of the vehicles that exceed the speed limit are convertibles, how many of the vehicles that exceed the speed limit are convertibles?
    (1) 2,000 of the trucks on the highway exceed the speed limit.
    (2) 6,000 of the vehicles on the highway are trucks.

80. If $xy \neq 0$, is $\frac{x}{y} < 0$?
    (1) $\frac{x^2}{y^2} > 0$
    (2) $\frac{x^3}{y^3} > 0$

81. What is the value of the two-digit integer q ?
 (1) The sum of the two digits is 18.
 (2) q is divisible by 9.

82. Is y an integer?
 (1) When y is divided by two, the result is the square of an integer.
 (2) When y is multipled by two, the result is the square of an integer.

83. If the units digit of integer n is greater than 2, what is the units digit of n ?
 (1) The units digit of n is the same as the units digit of n^2
 (2) The units digit of n^2 is the same as the units digit of n^3

84. What is the value of the integer t ?
 (1) Each of the integers 2, 3, and 5 is a factor of t.
 (2) Each of the integers 60, 90, and 150 is NOT a factor of t.

85. What is the perimeter of equilateral triangle DEF?
 (1) The area of triangle DEF is $9\sqrt{3}$
 (2) $DE = 6$

86. In a survey of homeowners, what percent had refinanced their home in the last five years?
 (1) 35 percent of the homeowners surveyed who lived in City X had refinanced their home in the last five years, and 30 percent of the homeowners surveyed who did not live in City X had refinanced their home in the last five years.
 (2) The ratio of homeowners surveyed who lived in City X to those who did not live in City X was 3 : 1.

87. Is $4^{x+3} < 64$?
 (1) $4^{x+1} < 4$
 (2) $4^{x+2} > 4$

88. Of the universities surveyed about the qualificiations they required in prospective students, 25 percent required both a grade-point average (GPA) of 3.5 or higher and an admissions test score of at least 85%. What percent of the universities surveyed required a GPA of 3.5 or higher?

(1) Of the universities surveyed that required an admissions test score of at least 85%, one-third required a GPA of 3.5 or higher.

(2) The universities surveyed that required a GPA of 3.5 or higher and an admissions test score of at least 85% represented $\frac{5}{6}$of the universities surveyed that required a GPA of 3.5 or higher.

89. If R and S are points in a plane and R lies outside the circle C with center O and radius 3, does S lie inside circle C?

(1) ORS is an equilateral triangle.

(2) The length of line segment RS is 4.

90. If Vivica typed a document at an average rate that was greater than 90 words per minute, did it take her less than one hour to type this document?

(1) Vivica typed the first three-quarters of the words in the document in 42 minutes.

(2) Vivica's rate of words per minute was constant for the duration of the document.

91. In the xy-plane, if line m has negative slope and passes through the point $(r, 6)$, is the x-intercept of line m positive?

(1) The slope of line m is $-\frac{1}{2}$

(2) $r > 0$

92. If \$6,000 invested for one year at x percent simple annual interest yields \$450, what amount must be invested at y percent simple annual interest for one year to yield the same number of dollars?

(1) If \$4,500 were invested at y percent simple annual interest for one year, the investment would yield \$450.

(2) If \$6,000 were invested at y percent simple annual interest for one year, the investment would yield \$150 more than if it were invested at x percent simple annual interest.

93. If q is an integer, then q is divisible by how many positive integers?
   (1) If m is a divisor of q, there is only one value of m that satisfies the relationship $1 < m < q$.
   (2) $m = 3$

94. If m and n are negative integers, what is the value of mn?
   (1) $m^n = \frac{1}{81}$
   (2) $n^m = -\frac{1}{64}$

95. Is $x < 0$?
   (1) $-4x < 0$
   (2) $-4x^2 < 0$

96. If m and n are positive integers and $mn = 24$, what is the value of m ?
   (1) n is the square of a prime number.
   (2) m is the product of two distinct prime numbers.

97. Is x greater than x^3 ?
   (1) x is negative.
   (2) $x^2 - x^3 > 2$

98. If n is to be selected at random from set S, what is the probability that $\frac{1}{5}n - 4 \leq 0$?
   (1) Every term in S is an integer between 4 and 16, inclusive.
   (2) S is a set of 13 integers.

99. If n is an integer, is the prime number y equal to 5 ?
   (1) $y = n^2 + 1$
   (2) $y = n^3 - 3$

100. If s and t are positive, is $\frac{s}{t}$ less than st ?
   (1) $s^2 > 1$
   (2) $t^2 > 1$

4 Answer Key

For full explanations, see the next section.

1. B
2. B
3. B
4. E
5. B
6. E
7. C
8. C
9. E
10. D
11. E
12. B
13. A
14. B
15. C
16. E
17. A
18. C
19. A
20. E
21. C
22. B
23. A
24. E
25. D
26. E
27. C
28. C
29. C
30. E
31. C
32. B
33. D
34. E
35. A
36. C
37. A
38. C
39. B
40. A
41. C

42.	C
43.	E
44.	C
45.	E
46.	A
47.	C
48.	B
49.	C
50.	A
51.	C
52.	C
53.	B
54.	A
55.	B
56.	E
57.	C
58.	B
59.	C
60.	D
61.	B
62.	C
63.	B
64.	C
65.	C
66.	E
67.	C
68.	E
69.	C
70.	B
71.	A
72.	C
73.	B
74.	E
75.	D
76.	C
77.	C
78.	B
79.	B
80.	B
81.	A
82.	A
83.	E
84.	E
85.	D
86.	C
87.	A

88. B
89. A
90. C
91. B
92. D
93. A
94. B
95. A
96. D
97. B
98. A
99. C
100. B

5 Explanations

Each explanation includes reference to between 1 and 3 categories. If you find that one category is consistently giving you trouble, see the "Content Areas" section in the beginning of this guide to locate additional practice.

1. B

Explanation: Statement (1) leaves open the possibility that x, y, and z are consecutive integers: z is two greater than x, but it doesn't tell us anything about y, so (1) is insufficient. Statement (2), however, is sufficient. In any set of three consecutive integers, one of the three will be a multiple of 3.

2. B

Explanation: To find the value of y, we'll need the value of each of the four variables j, k, m, and n. We're told that each is not zero, and that each is a single-digit number, so we're limited to range between 1 and 9, inclusive. Statement (1) isn't sufficient: all we know is that each digit is greater than the previous one, but they could be 1, 2, 3, and 4 or 5, 6, 7, and 8. (Or any number of other possibilities.)

Statement (2) is sufficient. The three equations tell us that the four digits are equally spaced, and that the space between each pair is greater than one. Because j, k, m, and n are integers, a must also be an integer. Thus, a must be no smaller than 2, which means that j is no smaller than 3. If $j = 3$ and $a = 2$, then $k = 5$, $m = 7$, and $n = 9$. If a or j were larger, n would be larger than 9, which is impossible for a single-digit number. Thus, this set of values for the five variables is the only possibility.

3. B

Explanation: Statement (1) can be simplified: divide each side by x^2, and inequality turns into $1 > x$. In that case, x could be between 0 and 1, but it could also be negative. Insufficient. Statement (2) is not so simple. First, recognize that x and x^3 always have the same sign: if x is positive, x^3 must be positive. Thus, if $-x$ is greater than x^3, x must be negative. (If x were positive, $-x$ would be negative and x^3 would be positive, making it impossible for $-x$ to be greater.) If x must be negative, it can't be between 0 and 1, so Statement (2) is sufficient.

4. E

Explanation: The given equation is a quadratic with two variables where the constants should be. To find the values for those variables, we'd need both roots of the equation. Statement (1) tells us one of the roots: the factored version of the equation, then, is something like $(x + 3)(x+?)$. Because we don't know the other root, the statement is insufficient. Statement (2) tells us the same thing, just in a different form. Because each statement is insufficient and they are redundant, there's no value in combining them: the correct answer is (E).

5. B

Explanation: First, simplify the question. Another way of writing $\frac{29-n}{n}$ is as follows: $\frac{29}{n} - \frac{n}{n}$, or $\frac{29}{n} - 1$. If you want to know whether $\frac{29}{n} - 1$ is an integer, all that really matters is whether $\frac{29}{n}$ is an integer. $\frac{29}{n}$ will be an integer if and only if n is a factor of 29, and since 29 is prime, n must be 1 or 29. Long story short: the question is really asking whether n is one of those two numbers.

Statement (1) is insufficient: if n is prime, it could be 29, or it could be any number of other possibilities. Statement (2) is sufficient. $116 = (29)(2)(2)$, which means that the only odd factors of 116 are 1 and 29—exactly the two numbers we're interested in.

6. E

This is a classic example of a common GMAT trap. Statement (1) provides a range of values of a and b. Clearly, ab could be less than 11: if $a = 3$ and $b = 1$, for instance. But could ab be greater than 11? What the GMAT is testing is whether you consider non-integer values of the two variables. If you don't, you may think a and b could be no greater than 5 and 1, respectively, making $ab = 5$. However, the question doesn't specify that a and b are integers, so they don't have to be. If $a = 5.9$ and $b = 1.9$ (the precise values don't matter: just think of numbers very close to 6 and 2), ab is very close to 12—greater than 11. In other words, statement (1) is insufficient.

Statement (2) tells us that a and b are either both positive or both negative. In itself, that's insufficient: we know nothing about the exact values of a and b. Taken together, Statement (2) adds nothing to what we already knew after analyzing Statement (1)—in all of the cases we considered, a and b were both positive. Because Statement (2) doesn't clarify the situation, the correct answer is (E).

7. C

Explanation: Statement (1) is insufficient on its own: at this point, we know nothing about m. Statement (2), on its own, is also insufficient: without a connection, facts about m are irrelevant to t.

Taken together: Statement (1) tells us about t, not $\sqrt{t}$, but its easy enough to convert the equation $t = m^2$ into something about $\sqrt{t}$. Just take the square root of both sides, and Statement (1) says $\sqrt{t} = m$. If, as Statement (2) tells us, m is an even integer, $\sqrt{t}$ is also an even integer. The answer is yes, and the correct choice is (C).

8. C

Explanation: To answer this question, we'll probably need the value of x and the value of y. Statement (1) is insufficient: one equation with two variables isn't enough. The same can be said of Statement (2).

Together, the statements are sufficient. (1) is an equation as follows: $\frac{x+y}{2} = 7$, and (2) is $\frac{x-y}{2} = 1$. There's no need to solve for the values of x and y, but it's clear that one could. The correct answer is (C).

9. E

Explanation: Statement (1) may be tempting, but it's insufficient. Knowing that three integers are consecutive doesn't tell us their order. Statement (2) is also tempting: if you treat the inequalities like equations and divide each term by n, you're left with $x > y > z$. However, the statement is insufficient. The variable n could be positive or negative, and if it's negative, the signs in the inequality would have to be turned around. In other words, (2) could mean $x > y > z$, or it could mean $x < y < z$. That's not very helpful.

Taken together, the statements are insufficient. Each statement has the same limitations: we don't know the order of the three integers. The correct choice is (E).

10. D

Explanation: The trickiest part of this question may be the wording. There's only one type of integer that can't be expressed as the product of two integers, each greater than 1: a prime number. In other words, the question is asking whether m is prime.

Statement (1) is sufficient: if a number is a square of another integer, it is not prime. (It doesn't matter that the "two integers" in the question might not be different: unless the question specifies "different" or "distinct" integers, that doesn't matter.) Statement (2) is also sufficient: if a number is the cube of another integer, it is not prime.

11. E

Explanation: The most obvious way for a statement to answer the question would be for it to provide the value of $(y + z)$. Because we know the value of yz, getting the value of y or z would allow us to solve for the other variable, and also be enough information.

Statement (1) is insufficient: it doesn't give us $y + z$, and it doesn't even provide a single value for y. (It could be 3 or –3.) The same reasoning shows why Statement (2) is insufficient: z could be 2 or –2. Taken together, they are still insufficient. Having a pair of values for each variable doesn't give us $y+z$ or anything to help us find a specific value for either variable. The correct answer is (E).

12. B

Explanation: Statement (1) is insufficient: 2^x could be a wide range of numbers with very different numbers of factors. To take just two examples: if $x = 2$, $2^x = 4$, which has three factors (1, 2, and 4). If $x = 3$, $2^x = 8$, which has four factors (1, 2, 4, and 8). Statement (2) is sufficient: while p could be a very wide range of numbers, the square of a prime always has the same number of factors—three. Those factors are one, the prime number, and the square of the prime. That fact isn't extensively tested, but it's very handy to know should it come up.

13. A

Explanation: The question indicates that this will address overlapping sets: of the total population, we're told about the number of full-time students, and we're asked about what percent of that group is male. Statement (1) gives us the number of males in that group. Because we know the total number of City X residents, we can figure out what percent that number represents. (We don't need to actually do it, because this is Data Sufficiency.) Statement (1), then, is sufficient.

Statement (2) is not sufficient. We can figure out, from that information, the percent of those who are not full-time students who are male. However, that doesn't tell us anything about the makeup of the subset of full-time students.

14. B

Explanation: Statement (1) indicates that y^3 must be divisible by $64 = (4 \times 4 \times 4)$. If y^3 is divisible by 64, it could be divisible by 12 (if, say, $y^3 = 64(12)$), but it might not be (if $y^3 = 64$), so (1) is insufficient. Statement (2) is sufficient: by the same reasoning, y^3 must be divisible by $6^3 = 216$. 216 is divisible by 12, so any number divisible by 216 is also divisible by 12.

15. C

Explanation: Because Statement (1) gives you a range for q, it's useful to figure out the possible range of numbers that could be the sum of three different primes. The smallest such number is $2 + 3 + 5 = 10$. (Remember, 1 is not prime.) Next comes $2 + 3 + 7 = 12$. 11, or any number less than 10, cannot be written as the sum of three different primes. Statement (1), then, is insufficient: if q is 10, the answer is yes; if q is 9 or less, the answer is no. Statement (2) is also insufficient. If all three primes are odd, the sum would be odd, as in $3 + 5 + 7 = 15$. So if q is odd, the answer could be yes. But if q is 9 or less, the answer could be no.

Taken together, the statements are sufficient. If q is odd and less than 11, the largest possible value of q is 9. We've established that if q is less than 10, the answer is always no. The correct answer is (C).

16. E

Explanation: Statement (1) is insufficient. If $p = 5$, $p - 2$ is a prime number, and p is prime. However, if $p = 15$, $p - 2$ is a prime number but p is not prime. Statement (2) is also insufficient. If $p = 5$, $p + 2$ is a prime number, and p is prime. If $p = 15$, $p + 2$ is prime, but p is not.

Taken together, the statements are still insufficient. Having used 5 and 15 as possible values of q for each statement, that's easy to see: in each of those cases, $p - 2$ and $p + 2$ are prime, but in one case p is prime; in the other p is not. The answer is (E).

17. A

Explanation: Given the parameters of the question, there are a limited number of possible values for y: any square of an integer less than 10. For instance, y could be 1, 4, 9, 16, etc. Statement (1) limits the possibilities even further: if

y has exactly two prime factors, that eliminates 1, 4, 9, 16, 25, 49, 64, and 81, leaving only 36. Recognize that if a square has exactly two prime factors, its square root has the same two prime factors: it may be faster to check numbers 1 through 9 than squares 1 through 81. Either way, you're left with only one possible value, and (1) is sufficient.

On its own, Statement (2) is insufficient: y could be any even square, such as 4, 16, or 36.

18. C

Explanation: In questions where a symbol can stand for any arithmetical operation, your only course is to try each one to see which ones work. Statement (1) is insufficient: $2+2=4$ and $2\times 2=4$. Statement (2) is insufficient: $2+0=2$ and $2-0=2$. Taken together, the statements are sufficient: the only operation that works for both statements is addition, so $4\nabla 3=4+3=7$.

19. A

Explanation: The only way for a negative integer to be raised to a power and result in a positive number is for that power to be even. Thus, the only possible solution for Statement (1), given that x and w are integers, is $w=-3$ and $x=2$. If x were a larger even number, w would not be an integer; if x were not even, w couldn't be negative. Statement (1), then, is sufficient.

On its own, Statement (2) is insufficient: one equation with two variables is not enough to solve for both variables.

20. E

Statement (1) is insufficient. If x is a multiple of 8, it could be a multiple of 16—x could be 16, 32 or 64—but it could also not be a multiple of 16—x could be 8, 24, or 40. Statement (2) is also insufficient. The smallest value of x that fulfills that statement is 8, so it is very similar to the first statement. If $x=8$, the answer is no; if $x=16$, the answer is yes. Because the statements say virtually the same thing, taking them together doesn't help us; the correct choice is (E).

21. C

Explanation: Statement (1) is insufficient, as it only gives us the difference between the two regions. Statement (2) is also insufficient, also only providing a difference. However, those two differences are enough to solve the problem when taken together. Call the radius of the larger circle r and the radius of the smaller circle s, and you have the following equations:

$\pi r^2-\pi s^2=21\pi$

$2\pi r-2\pi s=6\pi$

Divide each equation by π, and you're left with:

$r^2-s^2=21$

$r-s=6$ or $r=6+s$

Plug the second equation into the first, as follows: $(6+s)^2-s^2=21$, which simplifies to $36+12s+s^2-s^2=21$, which is equivalent to $36+12s=21$, which can be solved for the value of s, the radius of the larger circle. Use s to find r, and with r, you can find the area of the smaller circle.

22. B

Explanation: Statement (1) is insufficient. Any number in which the last two digits are a multiple of 4 is divisible by four. In other words, $5,H72$ is a multiple of four regardless of the value of H. Statement (2) is sufficient. A number is divisible by 9 if the sum of the digits is divisible by 9. $5+7+2+H = 14+H$, so if $14+H$ equals a multiple of 9, H must be 4.

23. A

Explanation: Statement (1) is sufficient. If $m+n$ is divisible by 3 after being halved, it must be divisible by 3 in the first place. (In fact, that it is integer after being halved indicates that it's also a multiple of 2; altogether, that means $m+n$ is divisible by 6.) Statement (2) is insufficient on its own: we need information about n to evaluate $m+n$.

24. E

Explanation: Statement (1) should look familiar to you: it's equivalent to $(a-b)^2 = 16$. That means that $a-b$ is 4 or –4, but since we don't know which one, (1) is insufficient. The same limitation makes Statement (2) insufficient: $a-b$ must be 4 or –4. Because each statement says the same thing, they are still insufficient when taken together: choice (E).

25. D

Explanation: To translate the question: $x < 0.8y$. To find out if we can tell whether x is less than 100, take the equation given in Statement (1) and combine it with the inequality from the question. Plugging $y-24$ in for x:

$y - 24 < 0.8y$

$0.2y < 24$

$y < 120$

We care about x, so going back to the original equation: if y is less than 120, x must be less than $0.8(120) = 96$. If $x < 96$, x must be less than 100, so Statement (1) is sufficient.

We can skip several of those steps to evaluate Statement (2) on its own. If $y < 125$, x is less than $125(0.8) = 100$. The question wants to know whether x is less than 100, which (2) tells us, so it's sufficient on its own. The correct choice is (D).

26. E

Explanation: Statement (1) is insufficient. If $x < x^3$, x could be negative: x^2 will always be positive, so for any negative value of x, x^2 will be greater. x could also be positive and greater than 1: for any such value, x^2 will be larger. If x is positive and less than 1, x^2 is smaller. Long story short: according to (1), x must be negative or greater than 1. That isn't enough information.

Statement (2) is also insufficient. x must be between –1 and 0, or greater than 1. If x is a negative fraction, x^3 is a larger number: a negative fraction closer to zero. If x is a positive number greater than 1, x^3 is greater still.

Taken together, it's still not enough information to determine whether x is positive. x could be between –1 and 0, or it could be greater than 1. The correct choice is (E).

27. C

Explanation: If m and n are both positive integers, each must be a factor of 30. Statement (1) is insufficient: both 3 and 5 are odd primes that are factors of 30. Statement (2) is also insufficient. The only consecutive integers that multiply to 30 are 5 and 6, but that doesn't tell us which is which. Taken together, the statements are sufficient: if m must be 3 or 5, and it must be 5 or 6, m must be 5. The correct choice is (C).

28. C

Explanation: When you need to know how long it would take two hoses, working together, to accomplish a task, you need the rate for each hose. The overall time is given by $\frac{xy}{x+y}$, where x and y are the respective times it would take each hose to fill the pool. Statement (1) is insufficient. In algebraic form, it says that $\frac{\frac{xy}{x+y}}{2} + \frac{y}{2} = 21$. That's a 2-variable equation, so it's not enough to solve for each variable. Statement (2) is insufficient for the same reason; translated, it says that $\frac{\frac{xy}{x+y}}{2} + \frac{x}{y} = 16$.

Taken together, the statements are sufficient. Two variables and two equations is enough to solve for each variable and, in this case, solve the problem. The correct choice is (C).

29. C

Explanation: Statement (1) is insufficient. Knowing that v and w are integers may come in handy later, but we need to know something about the distance between v and w. Statement (2) is also insufficient. If v and w are integers, there are 3 integers between them. For instance, if v and w are 5 and 1, respectively, n could be 2, 3, or 4. However, if v and w are not integers, there are 4 integers between them. If v and w are 5.5 and 1.5, respectively, n could be 2, 3, 4, or 5.

Taken together, then, the statements are sufficient. Knowing that v and w are integers narrows down the possibilities implied by Statement (2). There are three integers n in between v and w if those two numbers are integers and the distance between them is 4.

30. E

Explanation: Statement (1) is insufficient: at their smallest, x and y could be 1 and 4, making $xy = 4$. At their largest, x and y could be 2 and 6, for a product of 12. xy, then, could be either greater than or less than 6. Statement (2) is also insufficient: x and y could be 2 and 5, resulting in a product greater than 6, or they could be 0 and 7, resulting in a product less than 6.

Taken together, the range of possibilities gets much smaller. x and y could be 1 and 6, making the answer "yes," but they could also be 2 and 5, making the answer "no." That's all you need to know to select choice (E), as the statements taken together do not answer the question.

31. C

Explanation: First, simplify the question. $\frac{x^p}{x^q}$ is equivalent to $x^{(p-q)}$, so in order to answer the question, we need both x and $p-q$. Statement (1) is insufficient because it doesn't provide x. Statement (2) is insufficient because it doesn't provide p or q. Taken together, the statements give you all that you need: plug in 4 for x and 1 for $p-q$, and you can evaluate the expression. The correct choice is (C).

32. B

Explanation: First, spend a moment thinking about the question stem. If x is negative and y is positive, it doesn't matter what the specific numbers are: the product will be less than three and x will be less than three. If x is positive, y would have to be greater than 1 in order for x to be less than three.

Statement (1) indicates that y is either greater than 1 or less than –1. We already know that if y is greater than one, x must be less than 3: it is either a positive number less than 3 or it is negative. If y is less than –1, x could be any positive number, not to mention a small negative number. (greater—closer to zero—than –3). Thus, (1) is insufficient.

Statement (2) tells us that x is between –3 and 3. That's all the information we need: obviously, if x falls in that range, it is less than 3.

33. D

Explanation: We're looking for either the product of r and s or the values of r and s. Because the question stem gives us one equation, if we get one more equation that includes one or both of the variables, that will allow us to solve for both variables.

Statement (1) gives us one such equation: $\left(\frac{2s}{5}\right)12 = 25$. We can solve for s, then use $\frac{r}{s} = 25$ to solve for r. (1) is sufficient. Statement (2) is also sufficient: it tells us that $\left(\frac{5r}{2}\right)4 = 250$, which allows us to solve for r. As in the first statement, we can then solve for s and answer the question.

34. E

Explanation: Most measurements in a circle (radius, diameter, circumference, area) are closely related, but the same is not true of chords. Statement (1) is not sufficient, as knowing the length of the radius tells us nothing about the length of the chord, which could be placed anywhere between the top of the circle and just above the center. Statement (2) is also insufficient—even if we know the placement of point P on the radius, there's no way to use that to find the length of the chord.

Taken together, we still have little information about chord AB. Unless the chord is part of a quadrilateral, triangle, or other figure, it's not possible to find the length of a chord from the measurements of the circle that contains it.

35. A

Explanation: To simplify the inequality, first multiply both sides by 49: $7^{x+2} > 49$. Then rewrite both sides so that they have the same base: $7^{x+2} > 7^2$. Then you can disregard the bases: $x + 2 > 2$, or $x > 0$. Remember that this is a question: we want to know if $x > 0$.

Statement (1) is sufficient: $\frac{1}{49} = 7^{-2}$, so we know that $7^{x-2} > 7^{-2}$, or $x - 2 > -2$, or $x > 0$. That answers the question directly. Statement (2) is insufficient: $7^{x-1} > 7^{-2}$, or $x - 1 > -2$, or $x > -1$. Given that inequality, x could be positive or negative, which isn't enough information.

36. C

Explanation: Statement (1) tells us the number of meters per rotation, which is useful for finding the total number of rotations over the course of the 300-meter path. But since it doesn't connect that number to a time, it isn't sufficient. Statement (2) connects the number of rotations with time, but taken on its own, there's no way to know the number of rotations the wheel will make in 300 meters.

Taken together, we have all the information we need: (1) allows us to find the number of rotations, and (2) tells us the amount of time per rotations. The correct choice is (C).

37. A

Explanation: In order to answer this question, we need to know the relationship between the number of X and the number of Y. Statement (1) is sufficient. It tells us the relationship between X and 7% more than Y, which we can express in an equation like this: $x = (0.6)(1.07y)$. We don't want to waste time working out the details, but if you divide both sides by y, you get the ratio: $\frac{x}{y} = (0.6)(1.07)$. Statement (2) is insufficient: we'd also need the number of Brand Y bottles sold in order to find the ratio.

38. C

Explanation: The question and statements deal with three variables. In order to solve for one of those three variables, we'll need three distinct equations. Statement (1) is insufficient: it gives us two equations (disguised as one). The two equals signs indicate two equations: $x = -y$ and $-y = z$. Statement (2) is also insufficient: it only contains one equation, which we can write as follows: $\frac{x+y}{2} = \frac{x+y+z}{3} - 8$.

Taken together, the two statements give us three equations including the relevant variables, so we can solve for z. We don't need to take the time, but if you're looking for algebra exercises, this one is worth working out. The correct choice is (C).

39. B

Explanation: Given that he won 80% (32) of his first forty matches, we need to know how many more matches he played in order to find the number of total matches he won. Statement (1) is a well-disguised tautology. In the first 40

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matches he played, he won 32; if he had won 50%, he would've won 12 fewer, or a total of 20. Since he did, in fact, win half of his matches after the first 40, the difference between what he actually did do and winning 50% of his matches is 12. We don't need (1) to tell us that. Insufficient.

Statement (2) is similar, but isn't a tautology. Because Igby won 80% of his first 40 matches, we know the difference of 18 more wins must have come after his first 40. In other words, 18 wins = 30% more wins. If 18 is 30% of the remaining number of games, the remaining number of games is 60. (2) is sufficient.

40. A

Explanation: x^2 will be greater than x when x is negative or x is greater than 1. x^2 is not greater than x when x is between 0 and 1, inclusive. Another way of thinking of the question then, is: is x between 0 and 1, inclusive?

According to Statement (1), x is not between 0 and 1, inclusive. If x is a positive fraction (say, $\frac{1}{2}$), x^2 is smaller (in this case, $\frac{1}{4}$), while $2x$ is larger still (1). The only way x^2 will be greater than $2x$ is if x is negative or x is greater than 2. (1), then, is sufficient.

Statement (2) is not sufficient. In this case, x could be negative or greater than 1, but it could also be a fraction greater than $\frac{1}{2}$. If $x = \frac{3}{4}$, $2x^2 = \frac{18}{16}$, which is greater than $\frac{3}{4}$. In other words, x could be between 0 and 1, or it could be greater or smaller than those endpoints.

41. C

Explanation: If r and s are consecutive even integers, $r = s + 2$ or $s = r + 2$. It's just a matter of figuring out which one. Statement (1) tells us that $r = 2$, as 2 is the only prime number. But s could be either 0 or 4, so it's not sufficient. Taken on its own, Statement (2) is not sufficient, as r and s could be any two positive even numbers. Together, we have all the information we need: (1) tells us that r and s are either 0 and 2 or 2 and 4, and (2) rules out the first case. We know that r and s must be 2 and 4, respectively, so the correct choice is (C).

42. C

Explanation: Statement (1) doesn't tell us anything useful about x, because we don't know much about p. x could be –4, -2—any even number, in fact. (1), then, is insufficient. Statement (2) is also useless on its own: it doesn't even tell us anything about x.

Taken together, there's more to work with. We can write the equation in (2) as follows: $\frac{2p+5}{11} = j$, where j is an integer. Rewriting that so that it's equal to p, we get: $p = \frac{11j-5}{2}$. Plugging that in to the first equation, we find that $x = 2(\frac{11j-5}{2} - 3)$, which turns into $x = 11j - 11$. Since j is an integer, $11j$ is a multiple of 11. Subtract 11 from a multiple of 11, and you still have a multiple of 11. Thus, we know that x is a multiple of 11, and the correct choice is (C).

43. E

Explanation: This looks like a very involved, tricky question, but it hinges on a single principle: in geometry (and usually in algebra, as well), if you are given nothing but ratios, you can never find an actual measurement. Both statements are insufficient on their own (and when taken together) because they give us the relationship between two different lengths, but never a length itself. The diagram could represent something 1 inch by 1 inch, or something 100 miles wide. The correct choice is (E).

44. C
Explanation: Statement (1) is insufficient, because x, y, and xy could be 4, 9, and 36, or 4, 16, and 64. Statement (2) is also insufficient, as x could be any integer between 1 and 4, inclusive. Taken together, they are enough information: the only perfect squares less than 5 are 1 and 4, and if $x = 1$, $y = xy$, which would mean that y and xy could not be distinct perfect squares, as required by Statement (1). Choice (C) is correct.

45. E
Explanation: To find the distance of a line from B to the center of the tree's base, we would need to create some kind of figure, probably a triangle, that included that line, and know something useful (like the angle measures) of that triangle. Statement (1) doesn't tell us anything relevant to that distance, so it is insufficient. Statement (2) is also irrelevant—it doesn't help us find any measures of the circle, such as the radius, that might help us. Taken together, the statements are still not enough. We only know the length of one line, and as we don't know the distance from C to the edge of the circle, we can't use that length to determine the radius of the circle.

46. A
Explanation: Since we're interested in $\sqrt{x}$, we should convert the statements to equations that tell us about $\sqrt{x}$. To do so with Statement (1), take the square root of both sides, which results in $\sqrt{x} = n^3$. Since n is an integer, n cubed must be an integer. Thus, $\sqrt{x}$ is an integer, so (1) is sufficient. To convert Statement (2), take the square root of both sides: $x = \sqrt{m}$, then take the square root again: $\sqrt{x} = \sqrt{rm}$. The square root of the square root of m might be an integer (if, say, $m = 16$), but we don't know. Thus, (2) is insufficient.

47. C
Explanation: Another way of phrasing the question would be as follows: Is z closer to x than it is to 16? Statement (1) gives us three possible values for z and x: 1, 4, and 9 (the only positive squares less than 16), and since $z > x$, z and x must be 9 and 4, 9 and 1, or 4 and 1, respectively. If the values are 9 and 1, z is closer to 16 than it is to x. If the values are 9 and 4 or 4 and 1, z is closer to x than it is to 16. (1), then, is insufficient. Statement (2) is also insufficient, as it only rules out one possible value of x.

Taken together, (2) rules out two of the possible sets of values for z and x, leaving only $z = 9$ and $x = 4$. Because we know the values of z and x, we can answer the question. The correct choice is (C).

48. B

Explanation: Statement (1) is insufficient. If z is a negative number close to zero (say, -1), y is positive (in this case, 3). If z is less than –4 (say, $z = -5$), y is negative (here, $y = 1$). In other words, y could be positive or negative. Statement (2) is sufficient. If the product of two numbers is negative, one number must be negative and the other positive. Because we are told that z is negative, y must be positive.

49. C

Explanation: This is a doozy of an algebra problem, but focus on simplifying, and it may not be as bad it looks.. First, see if the initial equation can be simplified. The left side can be rewritten as $(\frac{x}{p})(p^2) + \frac{x}{p}(q^2) + \frac{x}{p}(r^2)$, or $xp + \frac{x}{p}(q^2) + \frac{x}{p}(r^2)$. You can then subtract xp from both sides, leaving $\frac{x}{p}(q^2) + \frac{x}{p}(r^2) = yq + zr$.

Statement (1) is helpful, but not enough: it is insufficient. It allows you to replace yq and zr, leaving you with $\frac{x}{p}(q^2) + \frac{x}{p}(r^2) = q^2 + r^2$. Factor out the left side as follows: $\frac{x}{p}(q^2 + r^2)$, and divide both sides by $q^2 + r^2$. Finally, the question can be rewritten as, Is $\frac{x}{p} = 1$? Much better, but we still don't know.

Statement (2) is also insufficient on its own. If $x = p$, $\frac{x}{p} = 1$, allowing us to simplify the original equation to $(1)(q^2) + (1)(r^2) = yq + zr$. Again, better, but not that close.

Taken together, they are sufficient. Going back to result of Statement (1), the question is now, Is $\frac{x}{p} = 1$? Since we know that $x = p$, or $\frac{x}{p} = 1$, we can answer that question in the affirmative. The correct choice is (C).

50. A

Explanation: In order to answer the question, all we need is the ratio of x to y. Statement (1) is sufficient because it provides that, if in a slightly convoluted form. (1) gives us this equation: $5x = (3)(\frac{1}{2})(3y)$. Divide both sides by 5 and by y and you're left with $\frac{x}{y} = \frac{9}{10}$, which is enough information to find the value of V. Statement (2) is insufficient: without the value of x, the value of y is not enough information.

51. C

Explanation: It's not clear whether it will be helpful to rewrite the equation in the question, but in case it will be, it can be written as, Does $ac = b^2$? Statement (1) simplifies to $a = b$, which is insufficient, as it doesn't tell us anything about c. Statement (2) is also insufficient: the relationship between b and c may come in handy, but without knowledge of a, it's not enough.

Taken together, the two statements are sufficient. If $a = b$ and $b = c$, ac is the same as b^2. The correct choice is (C).

52. C

Explanation: Statement (1) is insufficient. Because we don't know the size of the set, knowing these two relationships is not enough. If the set is {1, 3, 5}, the answer is yes, but if the set is $\{1, 1, 3, 4, 5\}$, the answer is no. Statement (2) is also insufficient, as it tells us nothing about the numbers in the set.

Taken together, the statements are sufficient. If the three numbers are x (the middle number), $x - y$ (the smallest number) and $x + y$ (the largest), the median is x and the average is $\frac{x+(x+y)+(x-y)}{3}$, or $\frac{3x}{3} = x$. The correct answer is (C).

53. B

Explanation: Statement (1) is insufficient. There are many possible values of k that make $\sqrt{k}$ smaller than 4 and less than 1, including 9 and 10. If $k = 9$, $\sqrt{k} = 3$, and the answer is yes. If $k = 10$, $\sqrt{k} = \sqrt{10}$, and the answer is no. Statement (2) is sufficient on its own. If an integer has exactly three factors, it is a perfect square: the factors are 1, itself, and the square root of itself. Thus, since k must be a perfect square, $\sqrt{k}$ must be an integer.

54. A

Explanation: The diagonal of a rectangle is the hypotenuse of a right triangle formed by two of the sides. In other words, you can find d in the following equation: $d^2 = l^2 + w^2$ (the Pythagorean theorem). For this reason, Statement (1) is sufficient: it gives you d^2, from which you can find the length of d. Statement (2) is not sufficient: unless you have the values of l and w, it is not enough information to solve for d.

55. B

Explanation: Statement (1) is insufficient. If p is an integer and pq is an integer, q could be an integer: if, say, $p = 2$ and $q = 1$. However, q could also not be an integer. For instance, if $p = 2$ and $pq = 1$, $q = \frac{1}{2}$. Statement (2), however, is sufficient. If p is an integer, the only way for $p+q$ to be a non-integer is for q to be a non-integer. If q were an integer, $p + q$ would be an integer. Thus, the answer is no, and the statement is sufficient.

56. E

Explanation: The trickiest part of this question is understanding the setup. In each turn, a player is guaranteed at least 10 points: the question is, do they get only 10 points or get an extra 50 points, as well? Statement (1) is insufficient: it's a tautology. If the player got 60 points in a turn that he otherwise got 10 points, it's a given that he would 50 more points than he did otherwise. Because it's a tautology, not only is (1) insufficient, it also means that it can't contribute to solving the problem, which eliminates choice (C).

Statement (2) is the same basic idea. Getting 60 points each in four turns that the player actually got 10 points each means that the player would've gotten 50 extra points in four turns: a bonus of 200 points. This is also a tautology, which means that the correct choice is (E).

57. C

Explanation: Statement (1) is insufficient; x and y could be nearly anything. If $x = 3$ and $y = 1$, or $x = 8$ and $y = 2$, the expression returns an integer, so we don't know the value of y. Statement (2) is only about x, so it doesn't tells us anything about y.

Taken together, the statements are sufficient. There are only three possible values of x: 1, 2, and 3. Since y must also be a positive integer, the options are further limited. If $x = 1$, there's no way for $\frac{x}{y+2}$ to be an integer: the smallest the denominator could be is 3. The same reasoning applies to $x = 2$. Thus, x must be 3, and y must be 1, making the fraction $\frac{3}{1+2} = 1$, which is an integer.

58. B

Explanation: This question may look tricky, but what it's really asking is: is $x > y$? If x is greater than y, then $\frac{1}{x-y}$ is positive, and $y - x$ is negative. If y is greater than x, the left side is negative and the right side is negative. It doesn't matter what the exact numbers are. Statement (1) is insufficient: x and y are interchangeable (for any values of x and y, respectively, that fulfill this inequality, the values could be reversed and not effect the inequality) so it won't tell us whether x or y is greater. Statement (2) is sufficient: it's exactly what we need.

59. C

Explanation: Statement (1) is insufficient: if x and y are 2 and 3, respectively, x^y (2^3) is less than y^x (3^3), but if x and y are 3 and 2, respectively, the numbers are reverse and the answer is no. Statement (2) is insufficient for similar reasons: x and y could be (among other things) 1 and 64 or 64 and 1, respectively. In either case, $64^1 > 1^{64}$, but either one could be x^y or y^x.

Taken together, we can narrow down the exact values of x and y. The only consecutive integers that fulfill $x^y = 64$ are $x = 4$ and $y = 3$. Given the values of x and y, we can answer the question. The correct choice is (C).

60. D

Explanation: Statement (1) is sufficient. First, rewrite it as $\sqrt{3}\sqrt{z}$. Because $\sqrt{3}$ is not an integer, $\sqrt{z}$ cannot be. If $\sqrt{z}$ were an integer, the result of $\sqrt{3}\sqrt{z}$ would be (non-integer)(integer), which since $\sqrt{3}$ is a non-repeating, non-terminating decimal, will never be an integer. Statement (2) is also sufficient, for similar reasons. Rewrite it as $\sqrt{4}\sqrt{z} = 2(\sqrt{z})$. If $2(\sqrt{z})$ is not an integer, $\sqrt{z}$ must not be an integer. If $\sqrt{z}$ were an integer, the result would be (integer)(integer) = integer.

61. B

Explanation: Statement (1) doesn't tell us anything: since we can't trust Data Sufficiency diagrams to be drawn to scale, we can't tell which two sides and which two angles in triangle ABD are equal. Statement (2) is sufficient: $\angle ADB + \angle BDC$ makes up a straight line, so $100 + 2x = 180$. Because we can solve for x, we can solve for two of the angles in triangle BCD, so we can find the third angle, which is what the question asked for.

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62. C

Explanation: Statement (1) simplifies the equation in the question, but it is still insufficient. It allows us to rewrite the equation as $\frac{1}{x} + \frac{1}{x} = 6$, or $\frac{2}{x} = 6$, or, is $x = \frac{1}{3}$? Still, without knowing the value of y, it isn't enough. Statement (2) also isn't sufficient, as it is one equation with two variables.

Taken together, it is enough. From (1), we know that $x = y$, so we can rewrite (2) as $x + x = \frac{2}{3}$, or $x = \frac{1}{3}$. In turn, if $x = \frac{1}{3}$, $y = \frac{1}{3}$, so we know the value of both variables, which is enough information to answer the question.

63. B

Explanation: Another way of writing the question, where s = a side of T, would be: Is $3s = 2\pi r$? To answer that, we'd need some relationship between the two figures, or information about both s and r. Statement (1) is insufficient. It says that $s+r = 9$, which gives us one equation for two variables. Not enough. Statement (2) is sufficient: it says that $s = 2r$, so we get the relationship we need between the two figures. With that equation, we can rewrite the question as, Is $3(2r) = 2\pi r$? Or: Is $3 = \pi$? The answer is no, so the statement is sufficient.

64. C

Explanation: In order for $\frac{p}{q}$ to be greater than 1, p must be less than q. For example, if $p = -6$ and $q = -3$, $\frac{p}{q} = 2$. In other words, the question might as well be asking, Is $p < q$? Statement (1) doesn't answer that question, just telling us the difference between p and q, so it's insufficient. Statement (2) also doesn't answer the question: adding p to both sides of the equation, the result is: $q < p + 1$. Close, but not close enough.

Taken together, the statements are sufficient. Statement (1) says that $q = p + 2$ or $q = p - 2$. Since $q < p + 1$, q can't equal $p + 2$: $p + 2$ is greater than $p + 1$, and q is less than $p + 1$. In other words, q must equal $p - 2$, which means that p is greater than q. The correct choice is (C).

65. C

Explanation: There are many ways that $4m - 5n$ can and cannot be greater than m^2, so it's best to jump straight into the statements. Statement (1) is insufficient. It does establish that $5n$ is negative, which means that $4m - 5n$ is greater than $4m$: subtracting a negative number is equivalent to adding a positive number. Statement (2) is also insufficient, but helpful as well. If m is no greater than 4, $4m$ is no greater than 16. At the same value, m^2 is also 16. If m is less than 4, say $m = 3$, $4m = 12$ and $m^2 = 9$. In all possible cases, $4m$ is greater than or equal to m^2. However, that's not enough, because if $5n$ is positive, the left side of the inequality is less than $4m$.

Taken together, the statements are sufficient. If $4m$ is greater than or equal to than m^2 and $5n$ is negative, that means that $4m - 5n$ is greater than $4m$, which in turn indicates that $4m - 5n$ is greater than m^2. The correct choice is (C).

66. E

Explanation: If 30% of students who plan to attend college have GPAs of 3.5 or above and 60 percent of the students plan to attend college, that means 18% (30 percent of 60 percent) of the total students plan to attend college and have GPAs of 3.5 or above. Since we know that percent, we're looking for any way to find the total number of students—from there, we can find 18% of that number.

Statement (1) is insufficient: it gives us a number for the intersection of the sets (going to college) and (GPA of 3.0 and above), when we really need the intersection of (going to college) and (GPA of 3.5 and above). Statement (2) is also insufficient: knowing the number of students with GPAs of 3.5 and above doesn't help us find the number of those students who are going to college, or the total number of students.

Taken together, we still don't have enough information. Ultimately, we need a number to tie to one of the percents (number of students going to college, number of students with 3.0+ GPAs, number of students going to college with 3.5+ GPAs). Without any of those, we can't answer the question, no matter much other information we have.

67. C

Explanation: In a triangle, the shortest side corresponds to the smallest angle. So, to find the smallest angle, we need to find the relationship between the lengths of the sides. Statement (1) gives us such a relationship between x and y, but since it includes nothing about z, it's insufficient. Statement (2) is similar: relationship between y and z, but nothing about x. Taken together, we can deduce the relationships between each of the three sides, so we can find the smallest angle. It doesn't matter which one it is, as long as we know that, with enough time, we could figure it out.

68. E

Explanation: Statement (1) is insufficient. Any number that is the product of a prime number and a square of a prime (say, 7 and 2, resulting in 28) has exactly 6 positive factors. Since 28 is a possibility, q could be 29. But there are several other possibilities, including 12 (3 and 2) and 18 (2 and 3), both of which are one less than prime numbers. Statement (2) is also insufficient. Any multiple of six has prime factors of 2 and 3, and 30 is far from the only multiple of 6 that is one greater than a prime number.

Taken together, the statements are still insufficient. q could be 29, but it could also be 53: 52 has exactly 6 positive factors (it's the product of 4—a square—and 13—a prime) and 54 is a multiple of both 2 and 3.

69. C

Explanation: The statements look very closely related to the expression in the stem, but they don't provide much relevant information. To answer the question, you need the value of $(x-y)$ or the value of all the parts of $x^2-2xy+y^2$. Statement (1) is insufficient: if $(x+y)^2 = 81$, $(x+y)$ could be 9 or -9; in either case, it's impossible to determine the precise values of x, y, or $(x-y)$. Statement (2) is also insufficient: there are any number of possibilities for x and y when $(x+y)(x-y) = -9$.

Taken together, the statements are sufficient. If $x+y = 9$ and $(x+y)(x-y) = -9$, $x - y = -1$. If $x + y = -9$, $x - y = 1$. In either case, $(x - y)^2 = 1$. The correct choice is (C).

70. B

Explanation: In questions where a symbol can stand for any arithmetical operation, your only course is to try each one to see which ones work. Statement (1) is insufficient: $1-1 = 2-2$, and $\frac{1}{1} = \frac{2}{2}$. Statement (2) is sufficient: $0\times 1 = 0$, and that's the only operation that fulfills the equation.

71. A

Explanation: Another way to look at the equation in the question is to rewrite it to be equal to k: $k = v - w$. Statement (1) is sufficient: if $v^3 = w^3$, then $v = w$. If $v = w$, $v - w = 0$, so $k = 0$. Statement (2) is a classic GMAT trap: if $v^2 = w^2$, then it's possible that $v = w$, but v could equal $-w$, as well. (2) is insufficient.

72. C

Explanation: Since the inequality in Statement (1) has x's on both sides of the inequality sign, simplify it. Subtract $5x$ from both sides, resulting in: $1 > x$. That's insufficient: x could be a small positive number or a negative number. Statement (2) is also insufficient: for x^2 to be greater than 1, x could be greater than 1, or it could be less than -1.

Taken together, the statements are sufficient. If $x < 1$ (as (1) tells us, then x cannot be greater than 1. x must, then be less than -1, in which case it must be negative. The correct choice is (C).

73. B

Explanation: If 30 members of the faculty coach boys' or girls' sports and 18 do not coach boys' sports, then 12 do coach boys' sports. We want to know what subset of that 12 also coaches girls' sports. Statement (1) is irrelevant: it gives us the relationship between the number of coaches and non-coaches. (2) is exactly what we need: of the 18 who do not coach boys' sports, all of them must coach girls' sports. Then all the 10 who do not coach girls' sports must be part of the 12 who do coach boys' sports, leaving exactly two coaches who coach both.

74. E

Explanation: If $\frac{q}{3}$ is an integer, q is a multiple of 3. Since there are both even and odd multiples of 3, Statement (1) is insufficient. Statement (2) is also insufficient: an integer (even or odd) multiplied by three is still an integer. Taken together, there's still not enough information: (2) allows for q to be any integer, and (1) allows for q to be any multiple of three; the intersection of those sets includes an infinite number of both even and odd integers.

75. D
Explanation: Statement (1) is sufficient: the question gives us one equation and the statement gives us one more. With two distinct equations, we can solve for the two variables and find mp. Statement (2) is also sufficient: while we can't figure out the exact values for m or p, specifically, we know that one of them must be 12 and one of them must be 14. Regardless of which is which, mp is 12×14, which is all we need to know.

76. C
Explanation: Statement (1) is not sufficient: y could be 41, 42, or 43. Statement (2) is also insufficient: this statement is a convoluted way of saying that y is not a prime number. Taken together, the statements are sufficient: if y is 41, 42, or 43 and is not a prime, the only possibility is $y = 42$.

77. C
Explanation: The average of k and m is expressed as $\frac{k+m}{2}$, so we need to find the sum of k and m. Statement (1) is insufficient: it gives us one equation with three variables: $\frac{k+n+m+n}{2} = 15$, or $k + m + 2n = 30$. Statement (2) is also insufficient, providing another equation with the three variables: $\frac{k+m+n}{3} = 8$, or $k + m + n = 24$. Taken together, we are given enough information. While we can't solve for the specific values of k and m, we can find the sum of k and m. Subtract the second equation from the first, and the result is $n = 6$. Plug that in to the second equation: $k + m + 6 = 24$, or $k + m = 18$. The correct choice is (C).

78. B
Explanation: Statement (1) is insufficient. Once you simplify the right side of the equation, the s's cancel out, leaving you with $r\sqrt{t} = \sqrt{t}$, or $r = 1$, with no information regarding s or t. Statement (2) is sufficient. First, cross-multiply: $rst^2 = \sqrt{t}\sqrt{t}$, $rst^2 = t$, $rst = 1$.

79. B
Explanation: If 20 percent of the vehicles on the highway exceed the speed limit and 50 percent of those are convertibles, 10 percent of the total vehicles are convertibles that exceed the speed limit. Thus, if we can find the total number of vehicles on the highway, we can answer the question. Statement (1) is insufficient: we don't know anything about the percentage of trucks that exceed the speed limit, so knowing the number doesn't help us find the total number of vehicles on the road. Statement (2) is sufficient: since we know that 25% of the vehicles on the road are trucks, we can find the total number of vehicles on the road.

80. B

Explanation: In order for $\frac{x}{y}$ to be negative, either x or y (but not both!) must be negative. Statement (1) indicates that x^2 and y^2 are both positive or both negative (either option would result in a positive fraction). Because squares are always positive, they must both be positive. However, that doesn't tell us whether x and y are positive: either a negative or a positive number results in a positive square. (1) is insufficient.

Statement (2) is sufficient. If x^3 and y^3 are both positive or both negative, we can say the same thing about x and y: if x^3 is positive, x is positive; if x^3 is negative, x is negative, etc. Because we know that x and y have the same sign, we know that $\frac{x}{y}$ is positive, so the answer is "no."

81. A

Explanation: Statement (1) is sufficient: there is only one two-digit number whose digits sum to 18: 99. Thus, $q = 99$. Statement (2) is insufficient: there are several two-digit numbers that are divisible by 9: for instance, 81, 90, and 99.

82. A

Explanation: Statement (1) is sufficient. Another way to write it is as follows: $\frac{y}{2} = j^2$, where j is an integer. Solving for y: $y = 2j^2$. If y is equal to the square of an integer times 2, it must be an integer as well. Statement (2) is insufficient. It can be written like this: $2y = j^2$, or $y = \frac{j^2}{2}$. y could be an integer if, for instance, $j = 2$, but if $j = 3$, $y = \frac{9}{2}$, which is not an integer.

83. E

Explanation: Regardless of the size of a number you're multiplying, if you want to find the units digit of the result, you just have to multiply the units digits of the numbers. For instance, if you want to know the units digit of 79×14, just multiply $9 \times 4 = 36$, for a units digit of 6.

Statement (1) is insufficient: n could be 5 (the units digit of the square is 5) or 6 (units digit of the square is 6). Statement (2) is also insufficient: n could be 5 ($n^2 = 25$, $n^3 = 125$), or 6 ($n^2 = 36$, $n^3 = 216$), for instance. Taken together, the statements are insufficient: both 5 and 6 satisfy both statements, so you can't determine the units digit of n.

84. E

Explanation: Statement (1) is insufficient: there are an infinite number of integers that have factors 2, 3, and 5. The smallest of them is 30, but any multiple of 30 (60, 90, 300, 1500, etc.) is possible as well. Statement (2) is also insufficient: without the information in (1), t could be any number up to 59, inclusive, among many others.

Taken together, t could equal 30, and could also equal 210—210 is a multiple of 30, so if fulfills the requirement of (1), and none of the numbers 60, 90, or 150 are factors of 210, so it also fulfills the requirement of (2). Since there are multiple possible values for t, the correct choice is (E).

85. D

Explanation: Statement (1) is sufficient: if you know the area of an equilateral triangle, you can find the perimeter. If a side is x, the height of an equilateral triangle is $(\frac{x}{2})\sqrt{3}$, as the height forms a $30:60:90$ triangle with one side and half of another side. Thus, the area is $x(\frac{x}{2})\sqrt{3} = 9\sqrt{3}$. Since you can solve for x, you can find the length of one side, and then the perimeter.

Statement (2) is also sufficient: all three sides in an equilateral triangle are equal (by definition), so if you know the length of one side, you can find the perimeter.

86. C

Explanation: Statement (1) is insufficient: unless you know the number or percentage of homeowners in and outside of City X, knowing the percentage of each group who refinanced is not enough information. Statement (2) is insufficient on its own: it tells us nothing about who refinanced.

Taken together, the statements are sufficient. It is essentially a weighted average problem which could be set up like this: $\frac{3(35\%)+1(30\%)}{4}$. It doesn't matter whether the ratio of $3:1$ represents 6 and 2 homeowners or 150 and 50 homeowners: in the weighted average, it simplifies to the same 3 and 1 over 4. Choice (C) is correct.

87. A

Explanation: In order to compare 4^{x+3} and 64, it's important to turn both expressions into exponents with the same base. $64 = 4^3$, so we can rewrite the question as: Is $4^{x+3} < 4^3$? In other words, Is $x+3 < 3$? Or, subtracting 3 from both sides, Is $x < 0$?

Statement (1) is sufficient. Do the same rewriting to make it simpler: $4^{x+1} < 4^1$, or $x+1 < 1$, or $x < 0$. Since the statement says $x < 0$, we can answer the question: x is, in fact, less than zero. Statement (2) is insufficient. $4^{x+2} > 4^1$, or $x+2 > 1$, or $x > -1$. In this case, x could be negative (if it is between -1 and 0), or it could be a positive number.

88. B

Explanation: Among the universities surveyed, there are four subgroups: those who required a 3.5 and an 85% score, those who require a 3.5 but not an 85% score, those who require an 85% score but not a 3.5, and those who require neither. We're given the percentage represented by the first group, and are looking for the sum of the first and the second groups.

Statement (1) gives us the relationship between the first group and the sum of the first and third, which is insufficient. Statement (2) is sufficient: we find out that the first group (both 3.5 and an 85% score) is $\frac{5}{6}$ of the sum of the first and second groups, so knowing that the first group is 25% of the whole population, we can find the percentage represented by the first and second groups together.

89. A

Explanation: Statement (1) is sufficient. If ORS is equilateral, that means $OR = RS = OS$. Since OR is longer than the radius of the circle (since R lies outside the circle), OS must also be longer than the radius. Since O is the center of the circle, any line that is longer than the radius must have an endpoint (in this case, S) that lies outside the circle.

Statement (2) is insufficient: we don't know how far outside of the circle R lies, so a length of 4 might place S in the middle of the circle or further still outside of the circle.

90. C

Explanation: Statement (1) is insufficient. We don't know whether her rate was constant: she may have typed the first three-quarters of the document more quickly or more slowly than the remaining quarter. Knowing her words per minute rate isn't helpful here, since the statement doesn't provide a number of words.

Statement (2) is also insufficient: it doesn't give any indication of the length of the document or how long it took, other than the fact that she worked at a constant rate.

Taken together, the statements are sufficient. If she worked at a constant rate, we know that, where x is the total amount of time it took her to type the document, $\frac{3}{4}x = 42$. We can solve for x, giving us a total number of minutes for the document, which will allow us to answer the question.

91. B

Explanation: To help visualize the setup of this question, imagine a dotted line at $y = 6$. The point $(r, 6)$ lies somewhere along that line, depending on the value of r. Because the slope of the line is negative, it will point diagonally downwards and to the right. Statement (1) is insufficient: without knowing the value of r, the line could be anywhere: very far to the left of the origin, very far to the right of the origin, or anywhere in between. Statement (2) is sufficient: if r is positive and line points diagonally downwards, the line will have traveled toward larger positive numbers by the time it reaches its x-intercept—as long as we know that the slope is negative, it doesn't matter the exact value of the slope.

92. D

Explanation: There's a lot of information in the question, but it boils down to something much simpler. With the first clause about x, we can find what x percent is. We won't spend time doing so, but we have enough information to do so. To find the amount necessary to invest at y percent to yield that number of dollars, we only need to find y: we can find out the number of dollars, so if we also find y, we can calculate the initial investment.

Statement (1) is sufficient: given an initial amount and a yield for one year at an interest rate, we can solve for the interest rate. Statement (2) is more complex, but still sufficient. Remember that we can find the value of x from the question, so we could find the amount that \$6,000 would yield at x percent interest. Given that number, we can add \$150 and find the value of y percent that yields that amount of money.

93. A

Explanation: Statement (1) is sufficient: if there is only one value of m that is a divisor (a factor) of m, that tells you how many factors there are: 3. (Those factors are 1, m, and q.) Statement (2) is insufficient: taken on its own, m has nothing to do with the question.

94. B

Explanation: It's very handy to know the various ways in which common GMAT numbers like 64 and 81 can be reached using exponents. For instance, $81 = 3^4$, -3^4, 9^2, or -9^2. From there, it's a single step to recognizing that $\frac{1}{81}$ is equal to any of those formulations with a negative exponent instead of a positive one. Since m and n are both negative, that limits the possibilities to -3^{-4} and -9^{-2}. Because there's more than one answer, Statement (1) is insufficient.

Along the same lines, $64 = 2^6$, -2^6, 4^3, 8^2, or -8^2. The only way to reach -64 with integers is -4^3, so the only way to get $-\frac{1}{64}$ is -4^{-3}. Because that's the only possibility, Statement (2) is sufficient.

95. A

Explanation: Simplify Statement (1): divide both sides by –4, and the result is $x > 0$. (Remember, if you divide an inequality by a negative, you must flip the sign.) If x is positive, you can answer the question of whether $x < 0$. (1) is sufficient. Now simplify Statement (2): divide both sides by –4, and the result is $x^2 > 0$. That's not very helpful: if x is positive or negative, x^2 is positive. Statement (2) is insufficient.

96. D

Explanation: If m and n are both positive integers, each must be a factor of 24. Statement (1) is sufficient: there's only one factor of 24 that is the square of a prime, and that's 4. If $n = 4$, $m = 6$. Statement (2) is also sufficient: only one factor of 24 is the product of two distinct primes, and that's 6. In both cases, it's crucial to remember that 1 is not prime.

97. B

Explanation: In order for x to be greater than x^3, x must be a negative number less than -1 or a positive fraction (between 0 and 1). Statement (1) doesn't tell us whether that is the case: x could be a negative fraction or less than –1, so it is insufficient. Statement (2) is tougher to decipher. First, recognize that in order for $x^2 - x^3$ to be greater than 2, it must be positive, which means that x^2 is greater than x^3. In order for that to be the case, x cannot be a positive number greater than 1 or a negative fraction. That eliminates every number except for those that make x greater than x^3 ($x < -1$ or $0 < x < 1$), so despite the fact that we don't know the exact range of numbers that satisfies (2), we know enough to declare that statement sufficient.

98. A

Explanation: First, simplify the question. $\frac{1}{5}n - 4 \leq 0$ is equivalent to $\frac{1}{5}n \leq 4$, which is the same as $n \leq 20$. So, the question wants to know the probability that n is less than or equal to 20. Statement (1) is sufficient: if n must be between 4 and 16, it must be less than 20. The probability is 100%. Statement (2) is insufficient: more important than whether n is an integer is the range of possible values for n. The correct choice is (A).

99. C

Explanation: Statement (1) is insufficient: y could be 5 (if $n = 2$), but y could also be 17 (if $n = 4$). Statement (2) is insufficient as well: y could be 5 (if $n = 2$), but y could also be 61 (if $n = 4$). Taken together, we can substitute the value of y in one equation into the other, giving us $n^2 + 1 = n^3 - 3$, or $n^2 + 4 = n^3$. There is only one integer that works in that equation: $n = 2$. Together the statements are sufficient, so the correct choice is (C).

100. B

Explanation: Because we know s and t are positive, we can simplify the inequality. Initially, it reads: Is $\frac{s}{t} < st$? First, multiply both sides by t: $s < st^2$. Then, divide both sides by s, which leaves you with the question, Is $1 < t^2$? After all that, it's clear that the question doesn't concern s at all.

Statement (1), then, is insufficient—we're only concerned with t. Statement (2) answers the question directly: we want to know whether t^2 is greater than 1, and (2) says that it is.